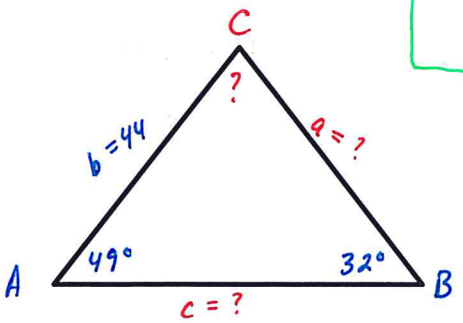
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Trigonometry

Emphasis on Solving Triangles Using the Law of Sines

Solve the following triangles given the provided information:

1. $\angle A = 49°$, $\angle B = 32°$, & $b = 44$



① $\angle C = 180 - 49 - 32$

$\angle C = 99°$

$$\frac{\sin 49}{a} = \frac{\sin 32}{44} = \frac{\sin 99}{c}$$

② $\frac{a \cdot \sin 32}{\sin 32} = \frac{44 \sin 49}{\sin 32}$

$a \approx 62.66468078$

$a \approx 62.7$

③ $\frac{c \cdot \sin 32}{\sin 32} = \frac{44 \sin 99}{\sin 32}$

$c \approx 82.00926605$

$c \approx 82$

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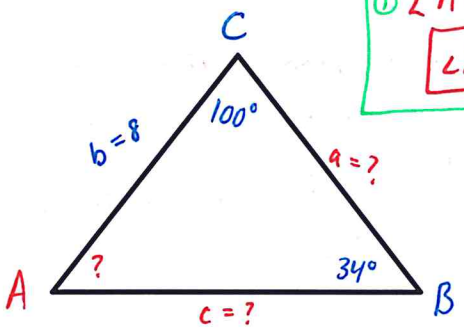
2. $\angle B = 34°$, $\angle C = 100°$, & $b = 8$



① $\angle A = 180 - 100 - 34$

$\angle A = 46°$

$$\frac{\sin 46}{a} = \frac{\sin 34}{8} = \frac{\sin 100}{c}$$

② $\frac{a \sin 34}{\sin 34} = \frac{8 \sin 46}{\sin 34}$

$a \approx 10.29111487$

$a \approx 10.3$

③ $\frac{c \cdot \sin 34}{\sin 34} = \frac{8 \sin 100}{\sin 34}$

$c \approx 14.08898785$

$c \approx 14.1$

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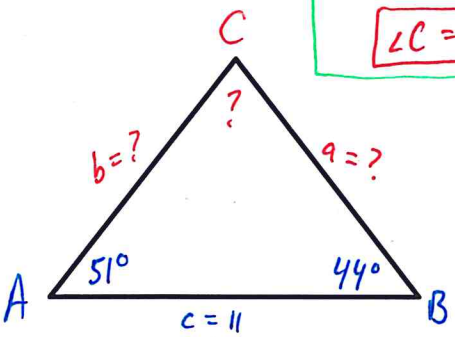
3. $\angle A = 51°$, $\angle B = 44°$, & $c = 11$



① $\angle C = 180 - 51 - 44$

$\angle C = 85°$

$$\frac{\sin 51}{a} = \frac{\sin 44}{b} = \frac{\sin 85}{11}$$

② $\frac{a \sin 85}{\sin 85} = \frac{11 \sin 51}{\sin 85}$

$a \approx 8.581259861$

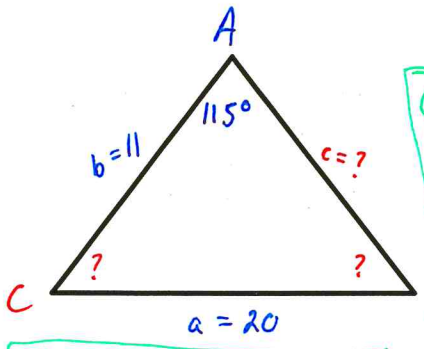
$a \approx 8.6$

③ $\frac{b \sin 85}{\sin 85} = \frac{11 \sin 44}{\sin 85}$

$b \approx 7.670430378$

$b \approx 7.7$

4. $\angle A = 115^\circ$, $a = 20$, & $b = 11$



$$\frac{\sin 115}{20} = \frac{\sin B}{11} = \frac{\sin C}{c}$$ ← Plug C in

① $\frac{20 \sin B}{20} = \frac{11 \sin 115}{20}$

$\sin^{-1}(\sin B) = \sin^{-1}\left(\frac{11 \sin 115}{20}\right)$

$\angle B = \sin^{-1}\left(\frac{11 \sin 115}{20}\right)$

$\angle B \approx 29.89878014$

$\angle B \approx 29.9^\circ$

② $\angle C \approx 180 - 115 - 29.9$

$\angle C \approx 35.1^\circ$

③ $\frac{c \cdot \sin 115}{\sin 115} = \frac{20 \sin 35.1}{\sin 115}$

$c \approx 12.68896197$

$c \approx 12.7$

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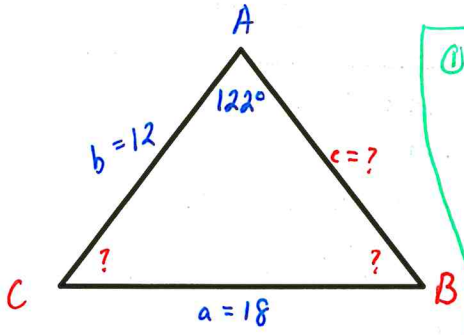
5. $\angle A = 122^\circ$, $a = 18$, & $b = 12$



$$\frac{\sin 122}{18} = \frac{\sin B}{12} = \frac{\sin C}{c}$$

① $\frac{18 \sin B}{18} = \frac{12 \sin 122}{18}$

$\sin^{-1}(\sin B) = \sin^{-1}\left(\frac{12 \sin 122}{18}\right)$

$\angle B = \sin^{-1}\left(\frac{12 \sin 122}{18}\right)$

$\angle B \approx 34.42766901$

$\angle B \approx 34.4^\circ$

② $\angle C = 180 - 122 - 34.4$

$\angle C = 23.6^\circ$

③ $\frac{c \cdot \sin 122}{\sin 122} = \frac{18 \sin 23.6}{\sin 122}$

$c \approx 8.497492794$

$c \approx 8.5$

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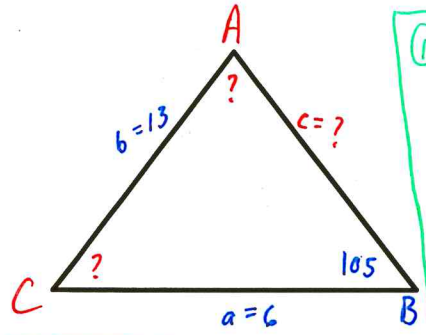
6. $\angle B = 105^\circ$, $a = 6$, & $b = 13$



$$\frac{\sin A}{6} = \frac{\sin 105}{13} = \frac{\sin C}{c}$$

① $\frac{13 \sin A}{13} = \frac{6 \sin 105}{13}$

$\sin^{-1}(\sin A) = \sin^{-1}\left(\frac{6 \sin 105}{13}\right)$

$\angle A = \sin^{-1}\left(\frac{6 \sin 105}{13}\right)$

$\angle A \approx 26.47529687$

$\angle A \approx 26.5^\circ$

② $\angle C = 180 - 105 - 26.5$

$\angle C = 48.5^\circ$

③ $\frac{c \sin 105}{\sin 105} = \frac{13 \sin 48.5}{\sin 105}$

$c \approx 10.07988823$

$c \approx 10.1$